2. SPECTRUM SURVEY AT THE NRQZ AND AT THE DOC LABORATORIES FOR 30 MHz TO 960 MHz

Spectrum occupancy measurements provide data on expected E-field strengths and probabilities of occurrence that are essential for assessing the degree of utilization at a given site or in a given area. NTIA has published a set of reports [22-25] documenting spectrum occupancy between 100 MHz and 19.7 GHz in some of the largest metropolitan areas in the United States.

In June 1998, a spectrum survey (E-field strength measurements) was performed inside the Table Mountain NRQZ and at the DOC Laboratories to determine E-field strengths using a vertically polarized receiving antenna. In April 2001, a spectrum survey was performed inside the Table Mountain NRQZ and at the DOC Laboratories to determine E-field strengths for a horizontally polarized receiving antenna. The results of these surveys are presented in this section.

2.1 Measurement System

The NTIA Radio Spectrum Measurement System (RSMS) was used to perform the field strength measurements (or spectrum survey). Hardware, software, and methodology used for this survey were the same as for earlier surveys referenced above. Those reports may be consulted for detailed descriptions of broadband spectrum survey techniques used at the Table Mountain NRQZ.

The RSMS is a mobile, self-contained computer-controlled radio-receiving system capable of many measurement scenarios over a frequency range of 30 MHz to 22 GHz. Figure 5 is a view of the RSMS with telescoping masts raised and antennas mounted for a broadband spectrum survey such as was performed at Table Mountain. The large box on the rear of the RSMS is an RF-shielded enclosure containing the measurement equipment.

The masts may be raised to as much as 9 m above ground level. For collection of spectrum data between 30 MHz and 960 MHz at Table Mountain, the forward mast was raised to full height. An omni-azimuthal directional antenna with a nominal frequency range of 30 MHz to 1000 MHz was used to receive signals. A 12 m RF cable connected the antenna to the measurement system input port, located inside the van.

The RSMS measurement system is shown as a block diagram in figure 6. It consists of two independent systems, each with its own antennas, receiver and signal processing equipment, and controller/data-recording computers. The two are designated System 1 and System 2. System 1 is on the right-hand side of figure 6. For the Table Mountain NRQZ survey, this system was used to measure signals between 30 MHz and 960 MHz. System 1 is built around a Hewlett-Packard 8566B spectrum analyzer and a Hewlett-Packard 85685A preselector. The preselector provides low-noise preamplification for a typical measurement system sensitivity of about 10 dB across the range of 30 MHz to 960 MHz. The preselector also provides bandpass filtering ahead of the preamplification, to protect the measurements from the effects of strong signals in close proximity to the measurement frequencies. Bandpass filters are varactors below 500 MHz and are yttrium-iron-garnet (YIG) above 500 MHz. Variable attenuation is available ahead of the bandpass filtering in the 85685A, but was not required for the NRQZ measurements.

The measurement system was controlled via a PC-compatible controller running custom-developed ITS measurement software. The computer program set all measurement parameters to operator specifications. Parameters are varied on a band-by-band basis (see measurement system data collection algorithms, below). The computer performed measurements on a band-by-band basis, in accordance with a preconfigured sequence for the bands between 30 MHz and 960 MHz. The computer recorded all measurement data to an internal hard drive for subsequent retrieval and analysis at the NTIA/ITS laboratory.

2.2 Measurement System Calibration and Correction to Incident Field Strength

The measurement system was calibrated at least once every 24 hours during the spectrum survey. RSMS calibrations make use of a NIST-traceable standard noise diode at the antenna connection point. The procedure is standard Y-factor, in which measured power with the noise diode turned on is compared to measured power with the noise diode turned off. System noise figure and gain are computed across the entire frequency range to be surveyed. Reports [22] through [25] contain detailed descriptions of this technique as implemented for the RSMS.

As data are collected, all measured amplitudes are corrected for the system gain. Corrected amplitudes are stored for later retrieval and analysis. These data are in units of decibels relative to 1 mW (dBm) for a measurement system with 50 Ω impedance.

Measured data are converted to other units, if necessary, during post-measurement data analysis. The conversion to incident field strength is accomplished by implementing the following equation (see References [11] and [26] for details):

$$|E| = P_{meas} + 77.2 + 20\log(f) - G_r\,, \tag{7}$$

where $|E|$ is the magnitude of the E-field strength at the antenna in units of dBμV/m, P_{meas} is the measured power in units of dBm, f is the frequency in units of megahertz (MHz), and G_r is the gain of the measurement antenna (the receiver antenna) at frequency f in units of dBi. Note, dBm refers to decibels relative to 1 mW, and dBi refers to antenna gain in decibels relative to an isotropic antenna.

2.3 Measurement System Data Collection Algorithms and Parameters

RSMS data collection algorithms and parameters are tailored to the characteristics of the signals that typically occupy each spectrum band. The two fundamental algorithms that are used are swept-frequency and stepped-frequency. Swept-frequency measurements require that data be collected as the measurement system is continuously tuned across a frequency range of interest. Swept-frequency measurements are used in non-radar bands. Stepped-frequency measurements require that data be collected at fixed-tuned frequencies, with detectors (usually peak) operated at each frequency for specified intervals of time. Stepped-frequency measurements are used in radar bands. For the purposes of this survey, stepped-frequency measurements were performed between 420 MHZ and 450 MHz and between 900 MHz and 930 MHz. All other bands utilized swept-frequency measurements.

Measurement parameters within each band are specified for maximum probability of intercept (POI). POI is maximized through careful selection of intermediate frequency (IF) bandwidth, video (post-detector) bandwidth, and detector type (e.g., peak versus average). The IF bandwidth is selected to match or slightly exceed the typical signal bandwidth within each band. Video bandwidth equals or slightly exceeds IF bandwidth. Detection may be either peak or sample, depending upon signal characteristics. Details are provided in References [22] through [25].

During the one-week period of this survey, the bands were visited in accordance with a preconfigured measurement sequence. The sequence was designed to ensure that each band was measured at least once during each hour of the diurnal cycle, and usually bands were measured several times during each hour. Bands that normally show highly dynamic changes in activity (e.g., land mobile radio bands) were visited much more frequently than low-dynamic bands (e.g., broadcasting). Details are described in References [22] through [25].

2.4 Data Storage and Analysis

All data for the Table Mountain NRQZ survey were recorded to the controller PC's internal hard drive. The data were later archived. Data initially recorded within each band showed maximum, minimum, and average signal strengths for periods of about a minute each, as described more fully in Reference [22] through [25]. Typically, each of these raw recordings was produced from dozens or even hundreds of individual spectrum analyzer sweeps.

When data were retrieved for analysis, all raw recordings for each band were combined to show the overall maximum, minimum, and average signal strengths within each band during the entire measurement period of one week. The cumulative data for all bands between 30 MHz and 960 MHz for the 1998 spectrum survey for a vertically polarized antenna are presented in Appendix A of this report (figures A.1 through A.34), and discussed in Sections 2.5 and 2.6. The cumulative data for all bands between existing TV channels from the 2001 spectrum survey for a horizontally polarized antenna are presented in Appendix A of this report (figures A.35 through A.43), and discussed in Section 2.7.

2.5 Table Mountain NRQZ Spectrum Survey Results: Vertically Polarized Measurements

Table 3 summarizes the measured occupancy and strengths on a band-by-band basis for the Table Mountain NRQZ. All signals that are required to meet the 47 CFR 73.1030 limits within the Table Mountain NRQZ were observed to be in compliance. Moreover, virtually all other measured signals within the NRQZ also meet the limits. This may be partly due to the relatively rural location of the NRQZ. Of the handful of signals that do not meet the limits (and which are not required to meet them, because they are mobile systems), the measurement data indicate that field strengths are typically exceeded only briefly.

The results of this spectrum survey allow us to conclude with certainty that for vertically polarized measurements the NRQZ is, in fact, quiet. It therefore remains a useful and necessary location for radio experiments that cannot be performed in the presence of high-level background signals.

2.6 DOC Laboratories Spectrum Survey Results: Vertically Polarized Measurements

As a comparative data set, a spectrum survey identical to the one at the Table Mountain NRQZ was performed at the DOC Laboratories in June 1998. The same measurement hardware and software were used as that for the Table Mountain survey. The RSMS was located next to the NIST groundscreen, an outdoor antenna range located on the west side of the DOC site. The location afforded a limited line-of-sight view of the city of Boulder, but was well within a propagation shadow for most Denver-area broadcast transmitters (on Lookout Mountain, near Golden, Colorado).

The groundscreen measurements were run for a week. Plots of the measured E-field strengths are shown in Appendix A, figures A.18 through A.34. Table 4 summarizes the measured occupancy and strengths on a band-by-band basis for the NIST groundscreen.

In most bands between 30 MHz and 960 MHz, the NIST groundscreen shows significantly higher signal strengths, and often more ambient noise, than the same bands within the Table Mountain NRQZ. Therefore, the Table Mountain NRQZ is an important resource for carrying out high-sensitivity, low-noise radio-wave measurements in these bands.

2.7 Analysis of Existing Television Signal Environment: Horizontally Polarized Measurements

The 1998 spectrum surveys at the Table Mountain NRQZ and the NIST groundscreen at the DOC Laboratories were performed with vertically polarized measurement antennas. This polarization, although useful for measuring most incident signals (land mobile radio, and radar, for example), was cross-polarized to most (horizontally polarized) television signals. To provide maximum coupling to television signals, the 1998 measurements were repeated between April 12–20, 2001, at the Table Mountain NRQZ and at the NIST groundscreen at the DOC Laboratories, this time using a horizontally polarized log periodic antenna (LPA). Measurements were also performed with the LPA at a second location at the DOC Laboratories, at the end of Wing 4 of Building 1 (the Radio Building). Other than the antenna used, all measurement conditions and parameters at these locations matched those of the 1998 spectrum survey.

The LPA was pointed in azimuth to maximize received signal strength from ambient television signals at these locations (that is, approximately toward Lookout Mountain). The gain of the LPA was factored into resulting measurements of incident field strength at these locations.

Because several television stations were already transmitting in the Denver area when the Table Mountain NRQZ was created, transmissions from those stations were grandfathered at preexisting levels exceeding the Table Mountain NRQZ limits. Those stations, and the strengths at which they are permitted to exceed the NRQZ thresholds, are shown in table 5.

The measurement results are shown in figures A.35 through A.43 and are summarized in tables 6 through 8. In these figures, maximum, minimum, and mean levels during the measurement period are shown. Additionally, note that the relatively high level of television carriers at the Table Mountain NRQZ required the insertion of 10 dB of attenuation in the bands with grandfathered signal strengths when the polarizations were matched. This attenuation was also used in the measurements in the other television bands, and at the other measurement locations, for the sake of consistency. This need for insertion of such attenuation is, in general, undesirable for DOC research programs conducted at the Table Mountain NRQZ and at the DOC Laboratories (see Section 8).

Table 6 summarizes the measured occupancy and strengths at the different locations for the 54 MHz through 88 MHz frequency range. Television signal strengths at the Table Mountain NRQZ are currently at the prescribed limits, including grandfathered signal strengths for Channels 4 and 6. Background noise levels on Channel 3 (unoccupied) are somewhat higher with horizontal polarization than with vertical polarization. Comparison of the Table Mountain NRQZ measurements with those performed on the NIST groundscreen facility and the end of Wing 4 of the NIST/ITS Radio Building on Broadway in Boulder, shows that the received television carrier field-strengths are higher within the NRQZ than at the DOC Laboratories on Broadway. But, apart from the TV signals, the spectrum is typically quieter at the Table Mountain NRQZ than at the Broadway locations. The noisier environment at the DOC Laboratories is due presumably to extensive development in the Boulder area. The characteristics of the ambient noise on the DOC Laboratories vary somewhat as a function of antenna polarization and precise location, but in no case is the ambient noise on the campus totally abated by polarization or location.

Table 7 summarizes the measured occupancy and strengths at the different locations for the 174 MHz through 216 MHz frequency range. Television signal strengths at the Table Mountain NRQZ are currently at the prescribed limits, including grandfathered signal strengths for Channels 7 and 9. Background noise strengths are comparable with horizontal and vertical polarizations. Comparing the Table Mountain NRQZ measurements with those performed on the NIST groundscreen and at the end of Wing 4 of the NIST/ITS Radio Building at the DOC Laboratories, the received television carrier field strengths are higher within the Table Mountain NRQZ than at the DOC Laboratories. But apart from the TV signals, the spectrum is typically quieter at the Table Mountain NRQZ than at the DOC Laboratories. The noisier environment at the DOC Laboratories is due presumably to extensive development in the Boulder area. The characteristics of the ambient noise at the DOC Laboratories vary somewhat as a function of antenna polarization and precise location, but in no case is the ambient noise on the campus totally abated by polarization or location. The overall higher level of maximum noise in the 1998 groundscreen measurements, relative to the 2001 groundscreen data, may be due to the longer period over which the 1998 measurements were conducted.

Table 8 summarizes the measured occupancy and strengths at the different locations for the 512 MHz through 806 MHz frequency range. Television signal strengths at the Table Mountain NRQZ are currently at the prescribed limits. Channel 41 appears to exceed the limit by 1 dB in the graph, but this is within the uncertainty of the measurement (a conservative estimate of the measurement uncertainty is ± 2 dB). Comparison of measurements at Table Mountain with those performed on the NIST groundscreen and at the end of Wing 4 of the NIST/ITS Radio Building at the DOC Laboratories, shows that the received television carrier field strengths are typically higher within the Table Mountain NRQZ than at the DOC Laboratories. But apart from the TV signals, the spectrum is typically quieter at the Table Mountain NRQZ than at the DOC Laboratories. The noisier environment at the DOC Laboratories is due presumably to extensive development in the Boulder area. The characteristics of the ambient noise at the DOC Laboratories are noted to vary somewhat as a function of antenna polarization and precise location, but in no case is the ambient noise on the campus totally abated by polarization or location.

Although existing television signals are somewhat higher in amplitude at the Table Mountain NRQZ than at the DOC Laboratories (due to direct LOS propagation to the Table Mountain NRQZ versus indirect propagation to the DOC Laboratories), the ambient noise level at the Table Mountain NRQZ is typically less than at the DOC Laboratories. The ambient carrier strengths within the Table Mountain NRQZ are within the limits described in 47 CFR 73.1030, with the exceptions of the grandfathered limits for Channels 4, 6, 7, and 9.

Due to terrain shadowing of transmissions from Lookout Mountain to the DOC Laboratories location, NTSC television signals typically have lower field strengths at the NIST groundscreen facility than within the NRQZ (which has line-of-sight coverage from most Denver-area NTSC broadcast station locations). This situation will change, and the Boulder DOC Laboratories will be subjected to significantly higher television signal strengths, if DTV transmitters are located in line-of-sight proximity to the DOC Laboratories. If that occurs, it will make the NRQZ environment even more important as an asset for measurements in the bands occupied by broadcast television. If new DTV transmitter locations do not have line-of-sight coverage of the DOC Laboratories, then a situation somewhat similar to the current propagation conditions may continue.

Table 3. Summary of the Table Mountain NRQZ spectrum survey: vertically polarized measurements.

Frequency range (MHz)	Description of activity measured at the Table Mountain NRQZ during one week in June 1998
30-54	This band shows little activity. Only one signal is present full-time. Even the highest signal measured was more than 20 dB below the NRQZ limit.
54-88	Television channels 2, 4, and 6 (measured with a vertically polarized antenna) are the significant occupants. All these signals are at or below the NRQZ limit.
88-108	This is the FM broadcast band. All signals are below the NRQZ limit.
108-136	Air-traffic-control voice communications and aeronautical navigation aids are observed in this band. Although not subject to the NRQZ limits, none of these signals exceeded the limit.
136-174	Land mobile radio signals are observed in this band. Most of these are intermittently transmitted. Some approached the NRQZ limit, but none exceeded it. Mobile signals are not required to meet the NRQZ limits.
174-216	Television channels 7, 9, and 12 (measured with a vertically polarized antenna) are the significant occupants. All these signals are at or below the NRQZ limit.
216-225	Little traffic is observed in this band, and all signals are well below the NRQZ limits.
225-400	Little traffic is observed in this band, which is used primarily for military communications, military air traffic control, and some aeronautical radio navigation aids. Although these signals do not need to meet the NRQZ limit, all were measured at strengths below the limit.
400-406	A few signals are observed in this band, which is used primarily for meteorological transmitters. None approached the NRQZ limit.
406-420	One signal in this land mobile radio band approached, but did not exceed, the NRQZ limit. These signals are not required to meet the limit.
420-450	No activity is observed in this band, which is used for long-range military radars. No such radars are operated in the Table Mountain area.
450-470	Heavy traffic is observed in this land mobile radio band. Although these transmitters do not need to meet NRQZ limits, only three exceeded the NRQZ limit, and then only momentarily.
470-512	Only television channels 14, 17, and 20 (measured with a vertically polarized antenna) are observed in this part of the spectrum. Their measured signals are below the NRQZ limit.
512-812	UHF television signals (measured with a vertically polarized antenna) are the only occupants observed in this part of the spectrum. Their measured signal strengths are well below the NRQZ limit.
806-902	Despite heavy observed traffic in the cellular telephone and trunked radio bands in this part of the spectrum, only a single, mobile signal (not subject to the NRQZ limits) momentarily exceeded the NRQZ threshold during the survey.
902-928	Although signals in this industrial, scientific, and medical (ISM) band are not subject to NRQZ restrictions, all observed signals were below the NRQZ limit, with a single, momentary exception for a single signal. Stepped measurements, performed to observe radar signals, show no activity. No such radars operate near Table Mountain.
928-932	Pager signals are observed in large numbers and densities, and do exceed the NRQZ limit. They are not, however, required to meet the limit.
928-960	Special mobile radio (SMR) traffic in this band is observed, and the signal densities were moderate compared to major metropolitan areas [22-25]. Many of these signals exceed the NRQZ limit, although typically for short intervals. These signals are not required to meet the NRQZ limits.

Table 4. Summary of NIST groundscreen spectrum survey at the DOC Laboratories: vertically polarized measurements.

Frequency range (MHz)	Description of activity measured at the DOC Laboratories, during one week in June 1998
30-54	This band shows substantial ambient noise. The same spectrum within the Table Mountain NRQZ is quieter.
54-88	Carriers for television channels 2, 4, and 6 are 20 dB to 30 dB (measured with a vertically polarized antenna) lower at the groundscreen than within the NRQZ. This is due to terrain shadowing of the DOC Laboratories from the transmitter locations. Table Mountain obtained line-of-sight propagation to these transmitters.
88-108	This is the FM broadcast band. Signals at the DOC Laboratories are 10 dB to 15 dB higher than within the NRQZ.
108-136	Air-traffic-control voice communications and aeronautical navigation aids are observed in this band. Power levels are comparable to those measured within the NRQZ, as would be expected for predominantly airborne signals.
136-174	Land mobile radio signals are observed in this band at strengths about 8 dB higher than within the NRQZ.
174-216	The highest-level carriers in this band at the NIST groundscreen are in the range of 60 dBμV/m to 70 dBμV/m field strength, comparable to the highest carriers in this band at the NRQZ (one of which is as high as 78 dBμV/m). But the groundscreen environment is noisier, with peak noise envelope amplitudes of between 35 dBμV/m and 40 dBμV/m. At the NRQZ, by comparison, the peak noise envelope is between 28 dBμV/m and 30 dBμV/m.
216-225	The groundscreen shows more signal activity, and significantly more noise, than within the NRQZ.
225-400	This spectrum is significantly noisier, and is occupied by more signals for a higher percentage of time, than within the NRQZ.
400-406	This spectrum is noisier, is occupied by more signals, and shows as much as 40 dB higher signal amplitude, than within the NRQZ.
406-420	Occupancy of this band is comparable in amplitude and number of signals to the NRQZ. The Boulder campus shows more noise (up to about 30 dBμV/m) than the NRQZ (at about 20 dBμV/m).
420-450	Noise at the groundscreen location occurs between 70 and 90 dBμV/m, as compared to peak strengths of only 60 to 70 dBμV/m within the NRQZ.
450-470	Signals at the groundscreen are 5 dB to 10 dB higher than within the NRQZ.
470-512	Due to terrain shadowing from television broadcast locations to the DOC Laboratories, television signals (measured with a vertically polarized antenna) in this band are equal to or lower in power at the groundscreen than within the NRQZ.
512-812	Terrain shadowing of the groundscreen location provides UHF television signal strengths (measured with a vertically polarized antenna) that are comparable to those within the NRQZ.
806-902	Cellular base station signals are about 8 dB higher at the groundscreen location than within the NRQZ.
902-928	At the groundscreen, peak envelopes of signals in this industrial, scientific, and medical (ISM) band are typically at field strengths of 50 dBμV/m to 65 dBμV/m. This is significantly higher than the typical peak envelope strengths of 40 dBμV/m to 45 dBμV/m within the NRQZ.
928-932	Pager signals at the groundscreen are comparable to those within the NRQZ.
928-960	Special mobile radio (SMR) traffic in this band occurs at about 10 dB higher strengths than within the NRQZ. Pager signals at the two locations are comparable. Above 940 MHz, signals at the groundscreen are typically about 20 dB to 30 dB higher than within the NRQZ.

Table 5. Grandfathered television signal strengths at the Table Mountain NRQZ.

Current NTSC channel	Grandfathered signal strength within the Table Mountain NRQZ (dBμV/m)	Decibels exceeding the Table Mountain NRQZ limit of +80 dBμV/m
4	84.1	4.1
6	81.8	1.8
7	94.4	14.4
9	94.3	14.3

Table 6. Television signals between 54 MHz and 88 MHz at the different measurement locations.

NTSC channel	Table Mountain	NIST groundscreen	End of Wing 4, Bldg. 1
2	With matched polarization on the measurement antenna, signal power is just below the limit (at +79 dBμV/m).	With matched polarization on the measurement antenna, Channel 2 maximum signal is +70 dBμV/m.	Maximum measured signal strength is +65 dBμV/m, 5 dB less than on the groundscreen.
4	With matched polarization on the measurement antenna, grandfathered signal strength is just below the limit (at +83 dBμV/m).	With matched polarization on the measurement antenna, Channel 4 maximum signal is +78 dBμV/m. A transient noise spike at 69 MHz occurred.	Maximum measured signal strength is +72 dBμV/m, 6 dB less than on the groundscreen.
5	With matched polarization on the measurement antenna, weak signal from a distant Channel 5 transmitter is observed at a maximum of about +55 dBμV/m.	With matching measurement antenna polarization, a significant signal (+60 dBμV/m) from a distant Channel 5 transmitter is noted.	Maximum measured signal strength is +57 dBμV/m, 3 dB less than on the groundscreen.
6	With matched polarization on the measurement antenna, grandfathered signal strength is just below the limit (at about +81 dBμV/m).	With matched polarization on the measurement antenna, Channel 2 maximum signal is +73 dBμV/m.	Maximum measured signal strength is +78 dBμV/m, 5 dB more than on the groundscreen.

Table 7. Television signals between 174 MHz and 216 MHz at the different measurement locations.

NTSC channel	Table Mountain	NIST groundscreen	End of Wing 4, Bldg. 1
7	With matched polarization on the measurement antenna, signal power is just below the grandfathered limit (at +93 dBμV/m).	With matched polarization on the measurement antenna, maximum signal is +61 dBμV/m.	Same comments as for the groundscreen measurements.
9	With matched polarization on the measurement antenna, grandfathered signal strength is below the limit (at +91 dBμV/m).	With matched polarization on the measurement antenna, maximum signal is +61 dBμV/m.	Same comments as for the groundscreen measurements.
10	With matched polarization on the measurement antenna, a weak signal from a distant Channel 10 transmitter is observed at a maximum of about +35 dBμV/m.	On vertical polarization, a signal (+25 dBμV/m) from a distant Channel 10 transmitter is noted. This is not seen in the horizontally polarized measurement, likely because of temporal variation in the indirect propagation of this signal.	Not observed in this measurement. This may be due to temporal variation in the indirect propagation of this signal.
11	With matched polarization on the measurement antenna, signal strength is well below the limit (at about +68 dBμV/m).	With matched polarization on the measurement antenna, maximum signal is +79 dBμV/m. This transmitter is located on a high rooftop a few blocks from the DOC Laboratories.	Same comments as for the groundscreen measurements.
12	With matched polarization on the measurement antenna, signal strength is below the limit (at about +75 dBμV/m).	With matched polarization, a weak signal (+35 dBμV/m) is noted. This Channel's service is carried on Channel 11 in the Boulder area.	Same comments as for the groundscreen measurements

Table 8. Television signals between 512 MHz and 806 MHz at the different measurement locations.

NTSC channel	Table Mountain	NIST groundscreen	End of Wing 4, Bldg. 1
31 and 32	Channel 31 is notable for having a paired digital transmission at Channel 32. Maximum measured carrier strength of +75 dBμV/m is typical for UHF television signals measured at Table Mtn. NRQZ	With matched polarization on the measurement antenna, maximum signal is +62 dBμV/m.	Similar results as for the groundscreen measurements.
41	With matched polarization on the measurement antenna, maximum signal strength is +91 dBμV/m. This matches the maximum allowed at the quiet zone, to within the measurement uncertainty of the RSMS.	With matched polarization on the measurement antenna, Channel 41 maximum signal is +96 dBμV/m. This is the highest television signal strength measured at any site during any measurement.	Similar results as for the groundscreen measurements.
Others	With matched polarization on the measurement antenna, typical maximum signal strengths are between +70 and +85 dBμV/m. A total of about 14 television signals are measured within the band.	With matched polarization on the measurement antenna, typical maximum signal strengths are between +60 and +80 dBμV/m. Two signals are observed at strengths of +86 and +92 dBμV/m. A total of about 15 television signals are measured within the band.	Similar results as for the groundscreen measurements. Note higher overall noise strengths than at the groundscreen.